

CLAIMS

1. A spindle motor driving method for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting a driving mode between a pulse-width modulation driving mode and a linear driving mode according to a command from a higher level system; and

supplying the spindle motor with the driving current corresponding to the driving mode which has been switched and selected between the pulse-width modulation driving mode and the linear driving mode.

2. A spindle motor driving circuit for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil,

said circuit comprising:

an output stage supplying driving current to said spindle motor for rotational driving thereof; and

driving mode switching means for switching and selecting a driving mode between a pulse-width modulation driving mode and a linear driving mode according to a command from a higher level system,

said output stage being configured such that said driving current, which corresponds to the driving mode switched and selected between said pulse-width modulation driving mode and said linear driving mode by said driving mode switching means, is supplied to said spindle motor.

3. A magnetic disk device, in which a magnetic disk is rotationally driven to record and reproduce a variety of information on said magnetic disk serving as a recording medium of the variety of information, said device comprising:  
the spindle motor driving circuit according to Claim 2,  
said spindle motor driving circuit being configured such that the driving of said output stage is switched between a pulse-width modulation driving mode and a linear driving mode by driving mode switching means according to a command from a higher level system.

4. A spindle motor driving method for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting between high and low through rates of a pulse-width modulation driving mode as driving characteristics according to a command from the higher level system; and

supplying to said spindle motor with said driving current corresponding to said through rate switched and selected between said high and low through rates.

5. A spindle motor driving circuit for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil,

said circuit comprising:

an output stage supplying driving current to said spindle motor for rotational driving thereof; and

through rate switching means for switching and selecting between high and low through rates of a pulse-width modulation driving mode as driving characteristics according to a command from a higher level system,

said output stage being configured such that said driving current, which corresponds to the through rate switched and selected from said high and low through rates by said through rate switching means, is supplied to said spindle motor.

6. A magnetic disk device, in which a magnetic disk is rotationally driven to record and reproduce a variety of information on said magnetic disk serving as a recording medium of the variety of information, said device comprising:

the spindle motor driving circuit according to Claim 5,

said spindle motor driving circuit being configured such that a through rate of an output stage driven in a pulse-width modulation driving mode is switched by through rate switching means according to a command from a higher level system.

7. A spindle motor driving method for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting a driving mode by a serial port between a pulse-width modulation driving mode and a linear driving mode according to a command from a higher level system that is received via a serial interface; and

supplying to said spindle motor with said driving current corresponding to the driving mode switched and

selected between said pulse-width modulation driving mode and said linear driving mode.

8. A spindle motor driving circuit for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil,

said circuit comprising:

an output stage supplying driving current to said spindle motor for rotational driving thereof; and

driving mode switching means for switching and selecting a driving mode between a pulse-width modulation driving mode and a linear driving mode by a serial port according to a command from a higher level system that is received via a serial interface,

said output stage being configured such that said driving current, which corresponds to the driving mode switched and selected between said pulse-width modulation driving mode and said linear driving mode by said driving mode switching means, is supplied to said spindle motor.

9. A magnetic disk device, in which a magnetic disk is rotationally driven to record and reproduce a variety of information on said magnetic disk serving as a recording medium of the variety of information, said device comprising:

the spindle motor driving circuit according to Claim 8,

said spindle motor driving circuit being configured such that a command from a higher level system that is received via a serial interface is sent to a serial port and an output stage is switched by said serial port to be driven by a pulse-width modulation driving mode or a linear driving mode according to said command.

10. A spindle motor driving method for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting a driving mode by a serial port between a pulse-width modulation driving mode and a linear driving mode according to a command from a higher level system that is received via a serial interface; and

supplying to said spindle motor with said driving current corresponding to said through rate switched and selected between said high and low through rates.

11. A spindle motor driving circuit for rotationally driving a spindle motor comprising a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor by supplying driving current to said coil,

said circuit comprising:

an output stage supplying driving current to said spindle motor for rotational driving thereof; and

through rate switching means for switching and selecting between high and low through rates of a pulse-width modulation driving mode by a serial port as driving characteristics according to a command from a higher level system that is received via the serial interface,

said output stage being configured such that said driving current, which corresponds to a through rate switched and selected from said high and low through rates by said through rate switching means, is supplied to said spindle motor.

12. A magnetic disk device, in which a magnetic disk is rotationally driven to record and reproduce a variety of

information on said magnetic disk serving as a recording medium of the variety of information, said device comprising:  
the spindle motor driving circuit according to Claim 11,  
said spindle motor driving circuit being configured such that a command from a higher level system that is received via a serial interface is sent to a serial port, and a through rate of an output stage, which is driven in a pulse-width modulation driving mode, is switched by said serial port according to said command.

13. A method of driving a magnetic disk serving as a recording medium of a variety of information, by which in order to record or reproduce the variety of information on said magnetic disk, driving current is supplied to a coil of a spindle motor comprising a rotor having a permanent magnet and a stator having said coil for rotationally driving said rotor, and said magnetic disk is rotationally driven by said spindle motor, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting a driving mode according to a type of an application in use such that driving in a pulse-width modulation driving mode is performed for a use in which a rotation sound of said spindle motor is not a serious problem for said application, and driving in a linear driving mode is performed for a use in which the rotation sound of said spindle motor is a serious problem for said application; and

supplying said spindle motor with said driving current corresponding to the switched and selected driving mode between said pulse-width modulation driving mode and said linear driving mode.

14. A magnetic disk device comprising a spindle motor including a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor, a spindle motor driving circuit for rotationally driving said spindle motor by supplying driving current to said coil, and driving mode determining means for determining a driving mode of said spindle motor driving circuit,

said magnetic disk allowing a magnetic disk serving as a recording medium of a variety of information to be rotationally driven by said spindle motor in order to record or reproduce the variety of information on said magnetic disk,

wherein

said driving mode determining means determines the driving mode according to a type of application in use such that driving in a pulse-width modulation driving mode is performed for a use in which a rotation sound of said spindle motor is not a serious problem for said application and driving in a linear driving mode is performed for a use in which the rotation sound of said spindle motor is a serious problem for said application, and

said spindle motor driving circuit includes an output stage supplying the driving current to said spindle motor for rotational driving thereof, and driving mode switching means for switching and selecting said driving mode according to the determination of said driving mode determining means,

said output stage supplying to said spindle motor with said driving current corresponding to a driving mode switched and selected between said pulse-width modulation driving mode and said linear driving mode by said driving mode switching means.

15. A recording medium, wherein as the driving mode determining means of the magnetic disk device according to Claim 14, a program is recorded to supply a software for

switching a driving mode of said spindle motor according to an application in use, such that said spindle motor is driven in a pulse-width modulation driving mode for a use in which a rotation sound is not a serious problem and said spindle motor is driven in a linear driving mode for a use in which the rotation sound is a serious problem.

16. A method of driving a magnetic disk serving as a recording medium of a variety of information, by which in order to record or reproduce the variety of information on said magnetic disk, driving current is supplied to a coil of a spindle motor comprising a rotor having a permanent magnet and a stator having said coil for rotationally driving said rotor, and said magnetic disk is rotationally driven by said spindle motor, the method comprising:

when supplying the driving current to the spindle motor for rotational driving thereof,

switching and selecting between high and low through rates of a pulse-width modulation driving mode as driving characteristics according to a type of an application in use, such that driving in said pulse-width modulation driving mode of a high through rate is performed for a use in which a rotation sound of said spindle motor is not a serious problem for said application, and driving in said pulse-width modulation driving mode of a low through rate is performed for a use in which the rotation sound of said spindle motor is a serious problem for said application; and

supplying said spindle motor with said driving current corresponding to said through rate switched and selected between said high through rate and said low through rate.

17. A magnetic disk device comprising a spindle motor including a rotor having a permanent magnet and a stator having a coil for rotationally driving said rotor, a spindle

motor driving circuit for rotationally driving said spindle motor by supplying driving current to said coil, and through rate determining means for determining driving characteristics of said spindle motor driving circuit,

said magnetic disk allowing a magnetic disk serving as a recording medium of a variety of information to be rotationally driven by said spindle motor in order to record or reproduce the variety of information on said magnetic disk,

wherein

said through rate determining means determines whether a through rate of a pulse-width modulation driving mode is high or low as driving characteristics according to a type of an application in use, such that driving in said pulse-width modulation driving mode of a high through rate is performed for a use in which a rotation sound of said spindle motor is not a serious problem for said application, and driving in said pulse-width modulation driving mode of a low through rate is performed for a use in which the rotation sound of said spindle motor is a serious problem for said application, and

said spindle motor driving circuit includes an output stage which supplies a driving current to said spindle motor for rotational driving thereof, and through rate switching means for switching and selecting between high and low through rates of said pulse-width modulation driving mode as driving characteristics according to the determination of said through rate determining means,

said output stage supplying to said spindle motor with said driving current corresponding to a through rate switched and selected between said high through rate and said low through rate by said through rate switching means.

18. A recording medium, wherein as through rate determining means of said magnetic disk device according to Claim 17, a

program is recorded to supply a software for switching a through rate of an output stage driven in a pulse-width modulation driving mode according to an application in use, such that a spindle motor is driven in said pulse-width modulation driving mode of a high through rate for a use in which a rotation sound is not a serious problem and said spindle motor is driven in said pulse-width modulation driving mode of a low through rate for a use in which the rotation sound is a serious problem.